

TENNESSEE.—Central office, Nashville. Director, Maj. H. C. Bate.† Organized March, 1883, by the State Agricultural Bureau. First report, April, 1883. Published by State Agricultural Bureau and State Board of Health. First weather-crop bulletin in 1887. Number of stations July 1, 1895, 47. Title of publication for June, 1895: Tennessee Journal of Meteorology and Monthly Agricultural Review (a publication devoted to agriculture, climate, and science). Vol. IV, No. 8. 8 pp. Maj. A. J. McWhirter, commissioner of agriculture, was director from 1883 to July, 1885. The service was then transferred to the State board of health, and Dr. J. D. Plunket, president, was made director until September, 1891, when the service was reorganized and J. B. Marbury made director.

TEXAS.—Central office, Galveston. Director, Dr. I. M. Cline.† Organized April and May, 1888, by Dr. S. O. Young, managing editor of the Galveston Daily News. First report, June, 1888, published by the Galveston Cotton Exchange. First weather-crop bulletin, July, 1888. Number of stations July 1, 1895, 93. Title of publication for June, 1895: Monthly Bulletin. Issued in cooperation with the Galveston Cotton Exchange. Vol. VIII, No. 6. 8vo. Galveston. 7 pp., 1 ch.

UTAH.—Central office, Salt Lake City. Director, J. H. Smith.* Organized September 16, 1891, by George N. Salisbury. First report, September, 1891 (milliographed), published by the U. S. Weather Bureau. First weather-crop bulletin, April 8, 1892. Number of stations July 1, 1895, 35. Title of publication for June, 1895: Monthly Report. 14 by 8 inches. Salt Lake City. 2 pp.

VERMONT.—(See NEW ENGLAND.)

VIRGINIA.—Central office, Lynchburg. Director, Dr. E. A. Craig-hill; J. N. Ryker,* assistant director. Organized May 25, 1890, by J. N. Ryker. First report, July, 1891, published by the State board of agriculture. First weather-crop bulletin, May 25, 1890. Number of stations July 1, 1895, 50. Title of publication for June, 1894: Monthly Report. Cooperating with State board of agriculture. Vol. V, No. 6.

Svo. Lynchburg. 11 pp. Mr. Ryker began to publish a weather-crop bulletin May, 1890.

WASHINGTON.—Central office, Seattle. Director, G. N. Salisbury.* Organized, in the summer of 1891, by Mr. E. B. Olney, Signal Corps, at Olympia. First report, August, 1891 (milliographed), published by the director. First weather-crop bulletin, in the spring of 1892. Number of stations July 1, 1895, 47. Title of publication for June, 1895: Monthly Meteorological Report and Summary. Milliographed. 14 by 8 inches. Seattle. 5 pp. Vol. V, No. 12. Central station was at Olympia until November, 1893. Reports were not issued for July, August, and September, 1892.

WEST VIRGINIA.—Central office, Parkersburg. Director, H. L. Ball.* Organized August, 1891, by W. W. Dent. First report, October, 1891 (milliographed), published by the U. S. Weather Bureau. First weather-crop bulletin, April 8, 1892. Number of stations July 1, 1895, 40. Title of publication for June, 1895: Monthly Meteorological Report. 14 by 8 inches. Parkersburg. 3 pp. Milliographed.

WISCONSIN.—Central office, Milwaukee. Director, S. C. Emory.* Organized October, 1890, by Robert E. Kerkam. First report, October, 1890 (milliographed), published by the director. First weather-crop bulletin, April 4, 1891. Number of stations July 1, 1895, 72. Title of publication for June, 1895: Wisconsin Weather and Crop Bulletin. Official publication of the Wisconsin Weather Service. 4to. Milwaukee. 4 pp. Monthly reports have been printed since January, 1892.

WYOMING.—Central office, Cheyenne. Director, E. M. Ravenscraft.* Organized in the fall of 1891 by E. M. Ravenscraft. First report, November, 1891 (milliographed), published by the U. S. Weather Bureau. First weather-crop bulletin, April 8, 1892. Number of stations July 1, 1895, 15. Title of publication for June, 1895: Monthly Bulletin. 4to. Cheyenne. 2 pp. Milliographed.

* Observer, U. S. Weather Bureau.

† Local Forecast Official, U. S. Weather Bureau.

NOTES BY THE EDITOR.

HORIZONTAL CLOUD ROLL.

The forms of clouds are almost innumerable, and observers will contribute to the advancement of meteorology by calling attention to any special form or modification that can be attributed to known peculiarities in the wind, the temperature, or the moisture. The passage of one layer of air over another is known to be frequently accompanied by one sort of wave formation at the boundary of the two strata. The relative velocities and the differences of density may be so related as to form rollers and breakers such as occur on the ocean. A case of this kind is noted by the Rev. S. W. Knipe, of Oceanic, on the coast of New Jersey, on June 3, in the current Meteorological Summary of the New Jersey Weather Service. He states that—

The wind had been west all day. The temperature was 92° at 3 p. m. At 4 p. m. the wind changed to south, and then to east. Clouds soon assumed the shape of a cigar about 2 miles in length, extending nearly east and west about 300 feet above the earth. The eastern end seemed to reach a short distance over the ocean, while the other end extended up the river half way to Red Bank. As this roller passed over the river it was accompanied by very high wind and a great fall of temperature, 17° in twenty minutes. The wind lasted but a few minutes, and the temperature gradually rose again, but by 9 a. m. it had fallen to 64°.

Long rolls of invisible air are doubtless perpetually moving above us; the top of such a roll is often visible as a long straight cloud or band of stratus haze; but only rarely is the whole roll visible as a revolving cloud.

THE WEATHER AND THE BIRDS.

In the Bulletin of the New England Weather Service for June, the editor, Mr. J. Warren Smith, says:

Many observers and correspondents having mentioned a general scarcity of birds this year, we have given the matter some investigation, and find that while the seed-eating birds like the scarlet hanger, flycatcher, the sparrows, and warblers, which winter mostly in the West Indies or farther south, are about as numerous as usual, the insect-eating birds which winter within the limits of the United States are unusually scarce. In many places where there are generally plenty of bluebirds, phœbes, robins and thrushes, one can search for hours

and not find a bird or nest. It is thought the unusually cold weather last winter and spring in the Southern States killed some birds, and many of the insects that they feed on, so causing the indirect death of many more. With the absence of these birds there must undoubtedly be a large increase in the insect pests in New England, unless the farmers take extra care to destroy them, and their destructiveness will probably be more marked next season than this.

THE DRY NORTHERS OF CALIFORNIA.

Much of the damage done to agriculture is due to the dryness of the air rather than to its temperature. Plants that thrive in a moist warm atmosphere are injured by dry air no matter whether the temperature is higher or lower. One of the first observers to record the injurious influence of this dry wind was Dr. Thomas M. Logan, (see page 303, Smithsonian Report, 1857), where he attributes its dryness to the fact that it is coming from a northerly region where its moisture has been precipitated. In addition to this it is now known that a more important cause of dryness is the fact that, in most cases, the air has descended from great altitudes to the lower valleys, and has been warmed by compression. When such descending air is notably warmed up we have the hot, dry winds of Kansas; when it is only slightly warmed we have the cool, dry norther of California. An excellent example of the latter occurred in the first week of June, as recorded in the Bulletin for May of the California Weather Service, where Mr. James A. Barwick says:

The reports from the various sections are very contradictory as to the effect of north wind on crops. In some places grain is reported to be badly damaged by shrinkage, especially the late-sown, which had passed the milky stage and was in the doughy state; this was somewhat shriveled, while that which was ripe and ready for the reaper was more or less shattered out and heads broken off by the high winds of the 7th and 8th. This north wind was much cooler than usual for the season of the year, on account of so much overflowed country across which this wind had to pass. The norther being so dry, caused rapid evaporation, and as evaporation from large bodies of water produces cold, it necessarily made the wind cooler than northerly winds usually do at this season of the year. Had the past season been one of small precipitation and little overflow in the tule basins, then the present norther would have done thousands of dollars' more damage than it has done at the present time, for no doubt the effects of the dry norther have been somewhat exaggerated both as to grain and fruits.